

## **QA61 – Nitrates in Infant Foods**

### **QUESTION:**

I am in need of clarification. Bright Futures in Practice Nutrition pg 45 states:

“Emphasize that before 6 months of age, infants should not be fed spinach, beets, turnips, carrots, or collard greens canned at home or by the manufacturer because they may contain too much nitrate, which can cause methemoglobinemia also called blue baby syndrome”. (Reference: Kleinman RE, ed. 1999. Pediatric Nutrition Handbook 4<sup>th</sup> ed. American Academy of Pediatrics).

The above reference however states “Infants fed solid foods before 4 months of age should not be given home-prepared or canned spinach, beets, turnips, carrots, or collard greens because they may contain sufficient nitrate to cause methemoglobinemia”. (No reference cited.)

Our WIC clinic recently received a feeding handout with the statement DO NOT give your baby homemade carrots, spinach, beets, turnips or collard greens before 6 months.

What is the difference between jar commercial carrots and homemade in nitrate content? Is the recommendation 4 or 6 months?

### **ANSWER:**

Methemoglobinemia in infants under 6 months of age is caused by excessive consumption of nitrates, which in the immature infant system can be converted to nitrites. The condition can be serious and even fatal. The most common source of nitrate exposure for infants is from water with high nitrate concentration, such as wells contaminated with animal wastes or fertilizers. The EPA has set a maximum contaminant level of 45 ppm nitrate for public water supplies.

Caution in offering most high nitrate-containing vegetables such as beets, carrots, and spinach to very young infants has existed for a long time. A recent study using ion chromatography determined the nitrate content of approximately 3 dozen commercial baby foods. Those with nitrate levels greater than 45 ppm included mixed vegetables, bananas, carrots, garden vegetables, spinach, green beans and beets. Beets had by far the highest levels of nitrates, 2000-2400 ppm.<sup>1</sup> The authors recommend delaying solid foods until 5-6 months of age (an accepted recommendation) to reduce potential risk of methemoglobinemia. After 6 months of age, the infant gut is more mature and less likely to convert nitrates to nitrites.

The difference between commercial and home-prepared baby food is the possible nitrates in water used for cooking or canning. In addition the home-prepared might be lower in water and therefore more concentrated. Other nitrate-containing foods not found in commercial baby food products include turnips, collard greens, and carrot juice.

Nutritional counseling regarding introduction of solid foods should emphasize readiness cues and emphasize the 5-6 months age. For children receiving solids at earlier ages, caregivers should be cautioned to avoid large or frequent consumption of high-nitrate foods, although there is no evidence that small amounts taken occasionally will

necessarily convert the nitrates to nitrites. The handout you mentioned appears to be taking the conservative approach, but does not mention the nitrates in commercial baby foods.

References:

- 1) Dusdieker, LB, Getchell, JP, et al. Nitrate In Baby Foods - Adding To The Nitrate Mosaic. Arch Pediatr Adolesc Med, 148:490-494, 1994.
- 2) Fomon, SJ: Nutrition of Normal Infants. Mosby, St. Louis, 1993.